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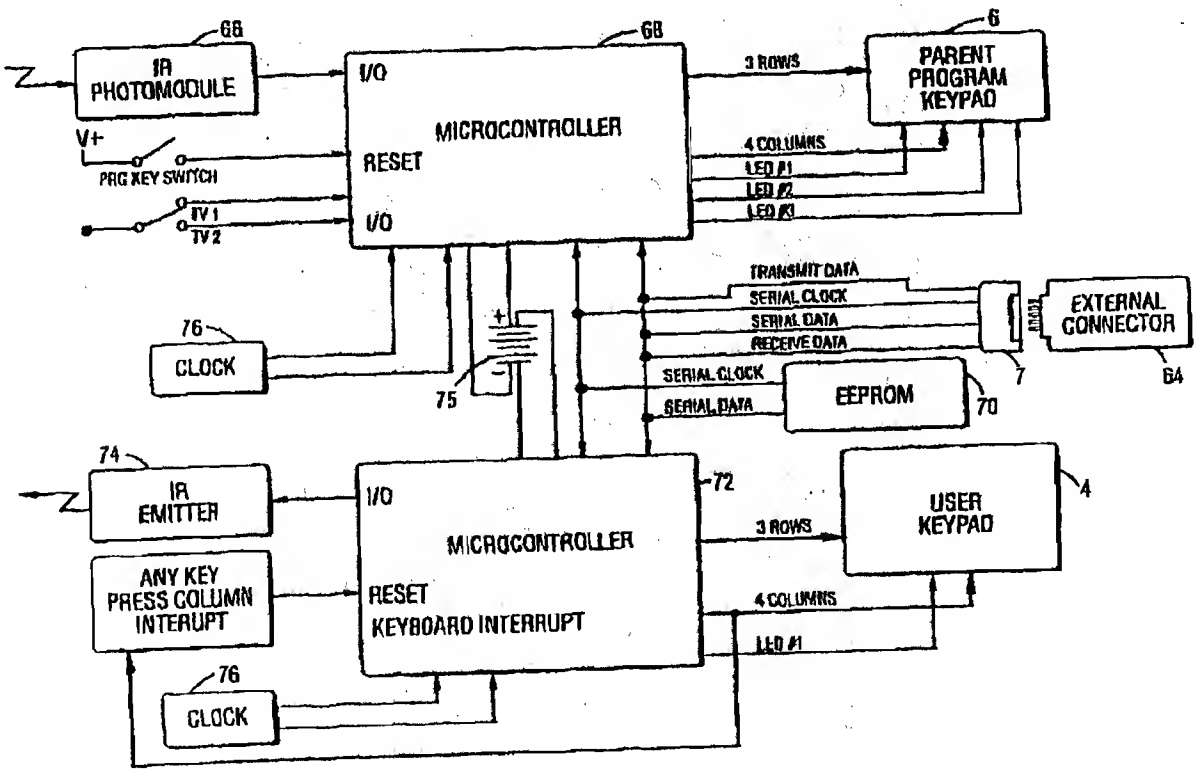
(54) Title: RECONFIGURABLE REMOTE CONTROL UNIT WITH PREPROGRAMMED MACRO FUNCTIONS AND METHOD



(57) Abrégé/Abstract:
A reconfigurable remote control transmitter for children. This transmitter is capable of learning remote control signals from a plurality of existing remote control devices, storing those signals and repeating the signals on demand, so that this remote control transmitter may operate a plurality of components including: a television, a Video Cassette Recorder (VCR) and a cable converter box or satellite television converter box. In a preferred embodiment, the remote control transmitter may operate two separate television systems, where the television systems may each include a television, a VCR and a cable or satellite

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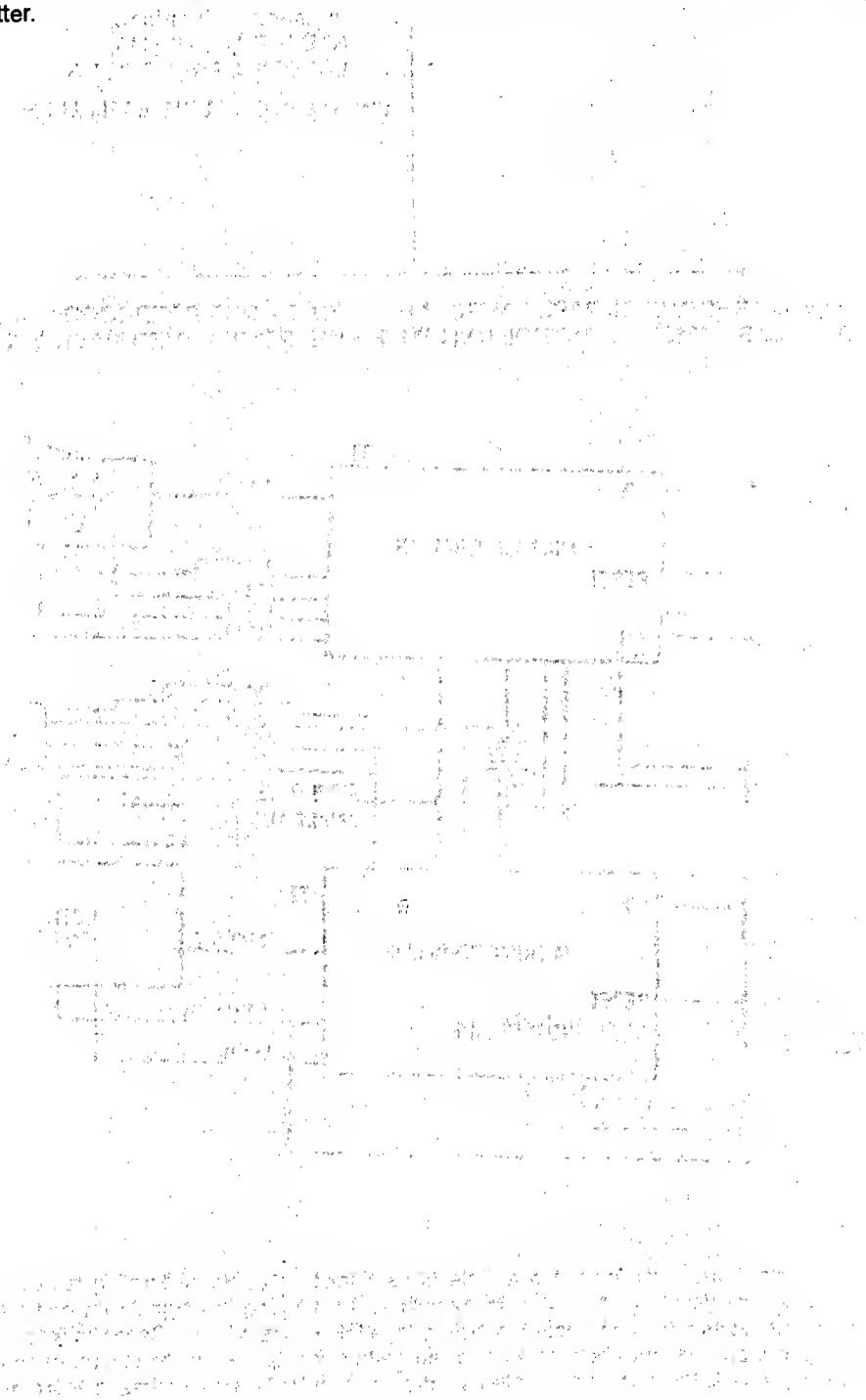
(57) Abrégé(suite)/Abstract(continued):
converter box. The reconfigurable remote control is designed for children, having a parental keypad that is inaccessible to children. This arrangement allows a parent to designate up to five channels that may be accessed using the remote control, so that a child using the device may only access channels that are approved and programmed by the parents. The remote control transmitter also includes a microprocessor that contains preprogrammed macro functions, which causes the transmitter to transmit a plurality of signals to several remotely controlled devices. The signals are transmitted in a particular sequence with a timed delay therebetween, so that multiple signals are transmitted in sequence after a user inputs a single command into the remote control transmitter.



ABSTRACT

A reconfigurable remote control transmitter for children. This transmitter is capable of learning remote control signals from a plurality of existing remote control devices, storing those signals and repeating the signals on demand, so that this remote control transmitter may operate a plurality of components including: a television, a Video Cassette Recorder (VCR) and a cable converter box or satellite television converter box. In a preferred embodiment, the remote control transmitter may operate two separate television systems, where the television systems may each include a television, a VCR and a cable or satellite converter box.

The reconfigurable remote control is designed for children, having a parental keypad that is inaccessible to children. This arrangement allows a parent to designate up to five channels that may be accessed using the remote control, so that a child using the device may only access channels that are approved and programmed by the parents. The remote control transmitter also includes a microprocessor that contains preprogrammed macro functions, which causes the transmitter to transmit a plurality of signals to several remotely controlled devices. The signals are transmitted in a particular sequence with a timed delay therebetween, so that multiple signals are transmitted in sequence after a user inputs a single command into the remote control transmitter.

Reconfigurable Remote Control Unit With Preprogrammed Macro Functions and Method

Inventors: John Stephen and Bruce Lundeen

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to reconfigurable remote controls that may be programmed to operate a plurality of remotely controlled devices. Specifically, the present invention includes a reconfigurable infrared (IR) remote control transmitter for children capable of learning remote control signals from a plurality of existing remote control devices, storing those signals and repeating the signals on demand, so that the remote control transmitter may operate a plurality of components including a television, a Video Cassette Recorder (VCR) and a cable converter box or satellite television converter box. In a preferred embodiment, the remote control transmitter may operate two separate television systems, where the television systems may each include a television, a VCR and a cable or satellite converter box.

The reconfigurable remote control is designed for children, having a simple operating keypad that is used by children and a parental programming keypad that is inaccessible to children. This arrangement allows a parent to designate up to five channels, one of which is designated as a primary channel, that may be accessed using the remote control, so that a child using the device may only access channels that are approved and programmed by the parents. The remote control transmitter also

includes a microprocessor that contains preprogrammed macro functions, which causes the transmitter to transmit a plurality of signals to several remotely controlled devices. The signals are transmitted in a particular sequence with a timed delay therebetween, so that multiple signals are transmitted in sequence after a user inputs a single command into the remote control transmitter.

2. **Discussion of the Prior Art**

Darbee	5,422,783
O'Donnell, et al.	5,414,426
Enomoto, et al.	5,128,667
Welles, II	4,623,887

The Darbee reference is directed to a modular casing for a remote control with a keyboard having keys thereon for selecting a predetermined function or channel selected from a group of keyboards having different layouts or shapes of keys and adapted to mate with a circuit board having switches thereon corresponding to the keys. The disclosed device contains an upper housing member slidingly received in grooves of a panel section to form a unitary cover which is secured to the lower housing member by screws or snap-fit interaction.

The O'Donnell patent discloses a remote control having a favorite key macro command and a chained macro command. The remote control disclosed in this reference allows a user to program a macro command into memory for enabling a user to select at least one favorite channel by entry of a series of keystroke commands on the keyboard.

The Enomoto reference teaches a wireless remote controller for outputting in

seriatim an operation mode signal for each of a plurality of receiving devices. The remote control disclosed therein allows a user to control a plurality of receiving devices without having to manually switch between the devices. The wireless remote controller has a plurality of operation selection keys and is designed to operate in such manner that when the controller is directed toward one of the devices under control and any one of the operation mode selection keys is depressed, a corresponding operation mode signal is generated and transmitted to a remotely controlled device, which responds only to the associated one of the signal components of the operation mode signal.

The Welles, II, patent discloses a reconfigurable remote control transmitter having the ability to learn, store and repeat the remote control codes from any other infrared transmitter. The disclosed device receives data from existing remote controllers, and then compresses and stores that data in nonvolatile memory for later use.

None of the prior art, however, discloses a reconfigurable remote control transmitter designed for children, having a simple operating keypad for children and a limited access parental keypad for programming selected channels, and a preprogrammed macro function for transmitting a plurality of commands to a plurality of components in sequence by entering a single input command into the device. Further, none of the prior art teaches a reconfigurable remote control having the combination of features outlined above, which may also seamlessly operate two separate television systems, where each television system may include a television, a

VCR and a satellite or cable converter box.

SUMMARY OF THE INVENTION

Accordingly, it is an important object of the present invention to provide a reconfigurable remote control transmitter for children that is capable of learning remote control signals from a plurality of existing remote control devices, storing and repeating the signals on demand, so that the remote control transmitter may operate a plurality of components including a television unit, a VCR, and a cable or satellite television converter box.

Another important object of the present invention is to provide a reconfigurable remote control transmitter for children, wherein the device includes a limited access parental keypad allowing parents to program selected channels for children, so that a child using the remote may only access channels that are chosen and programmed by the parents.

Another important object of the invention is to provide a reconfigurable remote control transmitter for children, wherein the device includes at least one preprogrammed macro function that allows a user to enter a single command, which causes the transmitter to transmit a plurality of signals in a timed sequence to operate a plurality of components.

Yet another important object of the present invention is to provide a reconfigurable remote control transmitter for children, wherein the device may serve to seamlessly operate two separate television systems, where each television system may include a television unit, a VCR, and a cable or satellite television converter box.

Yet another important object of the present invention is to provide a reconfigurable remote control transmitter for children having a simple operating keypad with a relatively small number of buttons with varying shapes to facilitate ease of operation for young children.

Another important object of the present invention is to provide a method for learning, storing and reproducing remote control signals from any of a number of different existing remote controls, including the step of providing a preprogrammed macro function that allows a single user input to actuate transmittal of a plurality of signals to a plurality of different components in sequence.

Another important object of the invention is to provide a reconfigurable remote control transmitter that may program a separate slave unit through the use of an external connector.

Yet another important object of the invention is to provide a reconfigurable remote control transmitter that may be used by elderly people, wherein the channel scan function may be toggled between scanning programmed favorite channels and scanning all available channels.

These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The construction designed to carry out the invention will be hereinafter described, together with other features thereof.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings forming a part thereof, wherein an example of the invention is shown and wherein:

Figure 1A is a perspective view of the reconfigurable remote control transmitter, showing the limited access parental keypad and the operating keypad; and

Figure 1B is a bottom exploded view of the reconfigurable remote control transmitter, showing the cover separated from the unit, and showing the serial communications port together with the battery cavity, and further showing the finder module;

Figure 2 is a block diagram showing the components of the reconfigurable remote control transmitter, including two separate microprocessors;

Figure 3 is a block diagram of an alternate embodiment of the remote control transmitter, showing the components of the reconfigurable remote control transmitter, including a single microprocessor;

Figure 4A is a perspective view of an alternate embodiment of the remote control transmitter, wherein the remote control transmitter is a slave unit capable of being programmed through the external connector;

Figure 4B is a bottom exploded view of the alternate embodiment of the remote

control shown in Figure 4A, showing the cover separated from the unit, and showing the serial communications port having an external connector and cord attached thereto, and also showing the battery cavity;

Figure 5 is another alternative embodiment of the remote control transmitter, for use with elderly people.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Figure 1 shows the reconfigurable infrared remote control transmitter 2, having a children's operating keypad 4 and a parental programming keypad 6. Access to the parental programming keypad is limited by a cover 8, which allows access for parents to program the remote control transmitter, while preventing children from having access thereto. The cover may be secured in a closed position by screws or a tight snap fit, or in any other suitable manner which would allow access for adults while preventing children from having easy access.

In a preferred embodiment, the operating keypad includes only twelve buttons, to facilitate ease of use by children. The remote control transmitter may be used to operate either one or two television systems, where each television system may include a television unit, a VCR, and a set-top device. A set-top device may include a cable converter box or a satellite television converter box.

The remote control transmitter has two modes of operation. The normal mode of operation is the user mode, where the remote control is used to operate a television system. The program mode is used by parents to program the remote control transmitter. The program mode allows the parents to program the remote control transmitter to operate one or two television systems by receiving signal commands from an existing remote control, storing the signals, assigning the signals to a corresponding button on the operating keypad, and emulating the signals on command. Parents may also designate which channels may be accessed by the remote control transmitter,

limiting channel access to those channels chosen and programmed by the parents. One channel is designated as a primary or favorite channel. As a default, any user button that has not been defined in programming mode should not disrupt other functions currently in use, because unprogrammed buttons will have no effect when pressed.

In a preferred embodiment, the parental programming keypad 6 includes fourteen buttons and a TV1/TV2 button 10. The button allows the user to toggle between television system one and television system two for programming purposes.

The remote control transmitter may be programmed to operate in different ways, depending upon the setup of the television system. When a TV and a set-top device are both plugged into separate outlets, the power button 12 is programmed to transmit a power-on or power-off command sequence to both the TV and the set top device. When a TV is plugged into the back of a set-top box, the power button is programmed to only turn on the set-top box, which automatically powers on the TV. Because most users plug the TV power cord into the back of the set-top box, the default setting for the power button is to simply power on the set-top box. As part of the power-on sequence of commands, after the power-on command is transmitted, the transmitter unit will then transmit a primary channel command, which automatically changes the television channel to the primary channel that has been programmed into the unit by the parents. If two television systems are programmed into the remote control transmitter, the power button causes the unit to transmit the applicable power-on sequence for television

system one (TV1) and then after a preset time delay, preferably about one second, if the button is still pressed, the unit will transmit the applicable power-on sequence for television system two (TV2).

The parental programming keypad includes six LED displays. LED#1 14 is the Start LED located adjacent the Start button 20. LED#2 15, is the Learn LED located adjacent the Learn button 41. LED#3 16 is the Done LED, located adjacent to the Done button. LED#4 21is used to indicate that a TV1 system component is being defined or deleted. LED#5 23 is used to indicate that a TV2 system component is being defined or deleted. The User LED 25 is located in the nose cone of the remote control transmitter, indicating that any user button has been pressed. The User LED 25 is also used during program mode to indicate that a working link has been established between the remote devices during the learning sequence.

First, when a user enters the program mode by pressing the Start button 20, LED#1 will be turned on. Prior to any programming functions being enabled, the remote control transmitter must be set to program enable mode in this manner. If no other key is pressed within ten seconds after the remote control transmitter has entered programming mode, the LED displays will turn off signifying that the device has exited program mode. Next, the user presses the appropriate function key, for example TV 22, VCR 24, STB 26 or F1 28, signifying that the selected function or device has been selected for programming. If no other key is pressed within ten seconds after the device has entered this level within the program mode, LED#1 will turn off signifying that the

device has exited the program mode.

Next, the user presses either the Learn button 41 or Delete button 42, depending upon which function they wish to perform. In this example, it is assumed that the user wants to define one of the TV system components and therefore would press the Learn button 41. After the Learn button 41 has been pressed, LED#2 will turn on to indicate that the unit is in learning mode. The user would then point his existing remote at the remote control device and press the buttons on his existing remote as if he were controlling the television system component he is currently trying to define.

When the remote control transmitter is receiving infrared (IR) pulses from another IR remote, the User LED 25 will blink, acknowledging receipt of IR pulses from the other remote, and signifying that a solid link between the two devices has been established. LED#3 will begin to flash, when the pulse sequence from another remote for program entry has been received correctly. At this point, the remote control device is ready to store the resulting memory into data for the chosen function. The user presses the Done button and the remote control unit will flash LED#1, LED#2 and LED#3 three times and then all LEDs will turn off signifying that the program sequence was either stored into memory or cleared if using the delete function from memory. If the device does not recognize the pulse sequence sent after ten seconds of attempting to receive IR pulses, then LED#1 and LED#2 will turn off, signifying that the device has exited program mode. The device can also exit program mode at any time if the software cannot recognize the IR pulses being sent from the existing IR remote device.

In order to support all the program functions for two television systems, the parental programming keypad will include a TV1/TV2 button 10 to toggle between television system one and television system two. After the user presses the Start button, either LED#4 21 or LED#5 23 will turn on signifying either television system one or television system two is enabled for programming resqectively. The remote control unit will default to television system one. However, if a user changed the position to television system two in a prior sequence, the unit will stay in its last selected state. After the user presses the Start button, he can push the TV1/TV2 system button if necessary to select the appropriate system he for which he wishes to define a device.

In order to program the remote control transmitter, the user will be required to have all the applicable remote devices they currently use to control devices connected to television system one and/or television system two.

Television Device Programming

To program for a television (TV), the user presses the start button to enter program mode. LED#1 will turn on solid to confirm that Program enable is on. The user may then select which television system he wishes to program for by pressing the TV1/TV2 system button. The user then presses the TV button on the device to confirm to the remote control device that the following program sequence is for defining a television set. Next, the user presses the Learn button 41 until LED#2 turns on solid to confirm that the unit is ready for IR decoding and learning. Then, the user takes his

existing television remote, points it directly at the remote control device and presses the power button. It should be noted that if the user's existing remote is a replacement universal remote, the user must press the TV button first on the existing remote, followed by the power button. At this point, if a solid link is established between the two remotes, where the IR path of both units are aligned properly, then the User LED 25 will blink to acknowledge receipt of data pulses. If a link has not been properly established, the remote control transmitter software will cause the unit to wait for ten seconds before aborting the program sequence, which will cause LED#1 and LED#2 to go out. After the pulse sequence has been sent to the existing remote and received successfully by the remote control transmitter, then the Done LED will flash, indicating that the user should press the Done button, thereby completing the programming sequence. After the user presses the Done button, to confirm that the entire program sequence was successful, LED#1, LED# and LED#3 will turn on and off in unison three times, then all turn off. This program sequence can be reset at any time prior to pressing the Done button by pressing the Start button 20 to enter a new program sequence.

If the user wishes to remove the TV device, the user presses the Start button 20 until LED#1 turns on solid, to enter program mode. The user may then select which television system he wishes to program for by pressing the TV1/TV2 system button. The user then presses the TV button, followed by the Delete button 42 to delete the TV device code from memory. LED#3 will flash immediately after pressing the delete

button, indicating that the user should press the Done button to complete the deletion sequence. Note that if a user attempts to delete a device that has not been programmed, the Start LED (LED#1) will go out, indicating that there is nothing to delete, because nothing had been programmed with respect to the deleted function.

Video Cassette Recorder (VCR) Device Programming

To program for a Video Cassette Recorder (VCR), the user presses the Start button 20 to enter program mode. The user may then select which television system he wishes to program for by pressing the TV1/TV2 system button. The user then presses the VCR button 24 on the remote control transmitter, to confirm to the remote control device that the following program sequence is for defining a video cassette recorder. In this sequence, as with any other programming sequence described herein, the LED displays behave as outlined heretofore. Next, the user presses the Learn button 41 until LED #2 turns on solid to indicate that the unit is in the learning mode. Then, the user takes his existing VCR remote control, points is directly at the remote control device and presses the power button. It should be noted that if the user's existing remote is a replacement universal remote, the user must press the VCR button first on the existing remote, followed by the power button. When LED #3 begins to flash, the user then presses the Done button 40 to complete the program sequence. The user may also remove the VCR device codes from memory by pressing the Start button, followed by pressing the VCR button and then pressing the Delete button.

Cable TV Set-Top Box or Satellite TV Device Programming

To program for either a Cable TV Set-top box or Satellite TV Set-top box, the user presses the Start button 20 to enter program mode. The user may then select which television system he wishes to program for by pressing the TV1/TV2 system button. The user then presses the STB button 26 to confirm to the remote control device that the following program sequence is for defining a Set-Top box. The user then presses the Learn button 41 until LED#2 turns on solid to indicate that the unit is in learning mode. Next, the user takes his existing Set-Top box remote control, points it directly at the remote control device and presses the power button. It should be noted that if the user's existing remote is a replacement universal remote, the user must press either the Cable button or Satellite button first on the existing remote, followed by the power button. When the LED #3 begins to flash, the user then presses the Done button 40 to complete the program sequence. The STB codes may be deleted in the same fashion as described before.

Favorite Channels Setup

This programming feature allows a parent to designate up to five channels that the remote control transmitter will access in user mode for the child by simply pressing the scan button. The first favorite channel, designated as the primary favorite channel, will also be available by its own button (favorite channel button 44) as well as being the default home channel whenever the remote control transmitter is first powered on. To program for the primary favorite channel, the user presses the Start button 20 to enter program mode. In this example, the user presses the F1 button 28 on the device

to confirm to the remote control device that the following program sequence is for defining a favorite channel, in this case, the first primary favorite channel. Next, the user presses the Learn button 41 until LED#2 is illuminated, indicating that the unit is in learning mode. Next, the user takes his existing remote that is used to change channels, points it directly at the remote control device, and presses the power button followed by the desired channel number. It should be noted that if the user's existing remote is a replacement universal remote, the user must press either the Cable button, Satellite button, or TV button, depending on which device is used to change channels, followed by the power button, and then followed by the desired channel number. When LED#3 begins to flash, the user then presses the Done button 40 on the remote control transmitter to complete the program sequence. The primary favorite channel will be available both by its own button and will be included along with the other favorite channels in user mode via the SCAN button 46, 47. The other channels may be programmed into the remote control transmitter by substituting any of the F2-F5 buttons (reference numbers 30, 32, 34, and 36 respectively) in place of the F1 button 28 in the above programming sequence, and the favorite channels may also be deleted by following the appropriate delete programming sequence outlined above.

Movie Button Channel Setting

The CH4 button 48 located on the parental keypad allows the user to set channel 4 as the tuner out position of the VCR device, if a VCR is used within the television system. The default setting of the movie button is channel 3. This function

is only used if the VCR device uses channel 4 for the VCR output signal.

To program the movie channel tuner output for channel 4, the user presses the Start button 20 to enter program mode. LED#1 will turn on solid to confirm that Program enable is on. The user may then select which television system he wishes to program for by pressing the TV1/TV2 system button. The user then presses the CH4 button 48 on the device to confirm to the remote control device that the following program sequence is for defining the movie channel tuner output to channel 4. LED#3 will begin to flash indicating that the user should press the Done button 40 to complete the programming sequence. After the user presses the Done button, to confirm that the entire program sequence was successful, LED#1, LED#2 and LED#3 will turn on and off in unison three times, then all turn off. This program sequence can be reset at any time prior to pressing the Done button by pressing the Start button to enter a new program sequence.

If the user wishes to remove the movie channel tuner output from channel 4 back to the default channel 3, the user presses the Start button until LED#1 turns on solid, to enter program mode. The user may then select which television system he wishes to program for by pressing the TV1/TV2 system button. The user then presses the CH4 button, followed by the Delete button to delete the CH4 setting from memory. LED#3 will flash immediately after pressing the delete button, indicating that the user should press the Done button to complete the deletion sequence. Note that if a user attempts to delete a device that has not been programmed, the Start LED (LED#1) will

go out, indicating that there is nothing to delete, because nothing had been programmed with respect to the deleted function.

Power TV (PTV) Setting

The PTV button 27 located on the parental keypad allows the user to set whether the remote control device should transmit a power on or power off command to the TV when the user presses the power button. This is used when the TV system has a Set-Top box and the TV set is not plugged into the Set-Top box allowing for automatic powering from the Set-Top box. The remote control devices default state is to assume that when a Set-Top box is used, the TV is plugged into it to support automatic powering.

To program the Power TV function, the user presses the start button to enter program mode. LED#1 will turn on solid to confirm that Program enable is on. The user may then select which TV system he wishes to program for both pressing the TV1/TV2 system button. The user then presses the PTV button on the device to confirm to the remote control device that the following program sequence is for defining the power TV function. LED#3 will begin to flash indicating that the user should press the Done button, thereby completing the programming sequence. After the user presses the DONE button, to confirm that the entire program sequence was successful, LED#1, LED#2, and LED#3 will turn on and off in unison three times, then all turn off. This program sequence can be reset at any time prior to pressing the DONE button by

pressing the Start button 20 to enter a new program sequence.

If the user wishes to remove the power TV function back to the default state, the user presses the Start button 20 until LED#1 turns on solid, to enter program mode. The user may then select which TV system he wishes to program for both pressing the TV1/TV2 system button. The user then presses the PTV button, followed by the Delete button 42 to delete the PTV setting from memory. LED#3 will flash immediately after pressing the delete button, indicating that the user should press the Done button to complete the deletion sequence. Note that if a user attempts to delete a device that has not been programmed, the Start LED (LED#1) will go out, indicating that there is nothing to delete, because nothing had been programmed with respect to the deleted function.

A user may determine if a given device or function has already been programmed by performing the following steps. The user presses the Start button until LED#1 turns on solid. Next, the user presses the appropriate function button that he wishes to obtain status for (i.e. TV, VCR, STB, and the like). Then the user presses the Delete button. If the Done LED (LED#3) begins to flash, then there is currently a device programmed for that function. The user then has the option of deleting that setting or pressing the Start button to reset the unit. If the Start LED (LED#1) goes out, then the unit resets itself automatically indicating to the user that no device was programmed for that function.

To facilitate ease of use by children, the operating keypad has only twelve

buttons in a preferred embodiment. The scan buttons 46, 47 cause the remote control transmitter to sequentially transmit channel changing commands in round-robin fashion, so that the child may flip through only those channels programmed by the parent. If only a TV is defined for either television system one (TV1) or television system two (TV2) or both, the scan buttons 46, 47 will cause the unit to transmit the channel sequence by using the TV device code. If a TV and Set-top box is defined, the scan button will cause the unit to transmit the channel sequence by using the STB device code.

The volume buttons 50, 51 will transmit the volume commands using the TV device code defined in programming mode. The mute button 52 will transmit the mute command using the TV device code defined in programming mode. When a VCR is defined for TV1 or TV2, the fuzzy button 54 will cause the unit to transmit the VCR device code to issue a VCR/TV tuner toggle transmit command. When the play button 56 is pressed, the unit will first transmit either a channel 3 or channel 4 command, depending on whether the CH4 button 48 has been enabled in program mode, followed by the VCR Play signal. The unit will transmit a channel 3 signal by default. The stop button 58, rewind button 60, and fast-forward button 62 will transmit the appropriate command signals to the VCR.

An optional feature of the remote control transmitter is a serial communications interface 7 for automated programming from a personal computer. This interface will be used whenever a major OEM has a requirement to pre-set the remote control

transmitter prior to shipment for ease of setup by the user. This arrangement allows a manufacturer to pre-program the transmitter to operate such components as a specific known satellite set-top converter box and defined family channel groups. For example, Satellite television companies have the same channel lineups nationwide as well as set-top box equipment allowing pre-programming through this external interface to support about 90% of the transmitters features, allowing for further ease of programming setup by the end user. This arrangement would only require the user to define the TV's, VCRs, and perhaps modify the favorite channel settings. In a preferred embodiment, the serial communications interface is positioned under the cover, so that the cover must be removed to utilize the serial communications interface.

Alternatively, the user may purchase the unprogrammed remote control transmitter, and may program the transmitter using a home personal computer, instead of using the parental programming keypad to manually program the transmitter.

Another optional feature is a find feature based on a sound recognition circuit 35, which will allow the user to have the remote control transmitter recognize a particular type of sound, such as the clapping of hands or whistling or any other suitable sound, and set off an alert tone. The purpose of his feature is to help find the remote control transmitter when it gets lost. The sound recognition circuit may be plugged into the serial communications port, under the cover of the unit for receiving power. When the serial communications port is needed for programming purposes, the sound recognition circuit may be unplugged, allowing access for an external connector

to an external data source.

Figure 2 shows a schematic diagram of one embodiment of the components of the remote control transmitter. An IR photomodule 66 is used to receive infrared signals from existir remotes. A first microprocessor 68 is coupled with the photomodule 66, a l is also used to control and receive information from the parental programming keyp 6. An external connector 64 is used to receive information downloaded from a omputer, when the optional Serial Communications feature is used. The data prc ammed into the remote control transmitter is stored in EEPROM memory 70 in a preferred embodiment, which does not require power, so that dead batteries will not cause the memory to go blank, thus preventing the necessity of reprogramming. A second microprocessor 72 is used in connection with the operating keypad 4. An IR emitter 74 is coupled with the second microprocessor 72 to transmit IR signals to remotely controlled devices. Each microprocessor has a clock function, shown as 76. Although Figure 2 shows the remote control transmitter having separate microprocessors for controlling separate functions, the remote control transmitter may include a single microprocessor 69 to perform all microprocessing functions, as shown in Figure 3.

Another alternate embodiment of the device includes a separate parental programming module. The parental programming module could be manufactured separately from the rest of the remote control transmitter, so that a single module could be used to program multiple remote control transmitters. In this alternate embodiment,

the programming module may be hooked up with remote control devices only long enough to program them. In another embodiment, the programming module may snap fit interchangeably into remote control transmitters for programming purposes, and could then be removed without affecting the performance of the remote control transmitter after programming.

The programming module contains an IR photomodule coupled to a microprocessor for receiving IR signals from an existing remote. A clock is connected to the microcontroller. A programming keypad is also coupled to the microprocessor, for inputting commands. Batteries 75 are optional in this embodiment, as the programming module may be self powered, or may be powered through attachment to a complemental remote control transmitter. An external connector for the serial communications interface is also included, which communicates with the microcontroller for receiving programming data from a personal computer. EEPROM memory is another option, which will store input data within the programming module if included therein. The programming module may operate in several different ways. In one embodiment, the programming module may be programmed first, and then attached to the remote control transmitter so that the data may be downloaded into the transmitter. Programming may either occur manually through the keypad, or through the external connector, through which information is downloaded from a personal computer. The external connector, which is attached to the serial communications port, may also be utilized in production to program the remote control transmitter unit.

to reduce the amount of programming necessary for the end use. In this embodiment, the EEPROM memory would be necessarily included. Alternatively, the programming module may be hooked up to a remote control transmitter first, and using the power and memory from the remote control transmitter, may then be programmed in either of the above-mentioned ways. In this embodiment, the batteries and EEPROM memory are not necessarily included in the programming module. EEPROM memory is necessary in all user remote control units.

In another alternative embodiment, the remote control transmitter may be used to program other slave units that do not have a programming keypad. Figure 4 illustrates a slave unit, which includes an operating keypad without the programming keypad. The slave unit receives programming through the external connector, attached to the serial communications interface. The source of the programming information may either be a personal computer, or another remote control transmitter having a programming keypad. For instance, if a user has a remote control transmitter with the programming keypad, and the user also has a complemental secondary remote control transmitter (slave unit), the first remote control transmitter may be linked through the external ports to the slave unit for programming purposes. The slave unit operates in operator mode in the same manner as the other embodiments of the remote control transmitter, having the same functions and capabilities, including the pre-programmed macro functions. This arrangement allows a user to purchase a standard unit and a slave unit, as opposed to buying two standard units, which should reduce the cost of

the purchases, and should reduce the time and effort necessary to program two separate remote control transmitter units. In a preferred embodiment, the serial communications port is located under the cover, and includes a cable connected directly to the microprocessor of the unit. The other end of the cable includes an external connector that may be plugged into a master transmitter unit with programming capabilities, or into a personal computer.

In another alternate embodiment, shown in Figure 5, the reconfigurable remote control transmitter could be designed for elderly users, with some slight modifications of the embodiments described above. The scan buttons, in this alternate embodiment, could be programmed to work in one of two ways. If the elderly user only wished to view a small number of channels, then the scan button would simply scan the programmed favorite channels. However, because elderly people would not necessarily want to be limited to scanning only the favorite channels, another function button, the all-button 78 may be added, which would toggle the scan function to determine and scan all available channels rather than just the preprogrammed favorite channels.

Another function button, the store button 80, could also be implemented on this alternate embodiment, allowing a user to add a particular channel to the favorite channels list. It is contemplated that the user could add as many favorite channels as he wishes. However in a preferred embodiment of this alternate embodiment, five additional favorite channels may be added to the original five favorite channels. If the

five additional channels have already been added, and the user wishes to store another, or a sixth, additional favorite channel, the software will delete the first additional channel that was programmed. The five original favorite channels may only be changed in program mode, as outlined above. A Scan-All LED 82 is illuminated when the unit is in Scan-All mode. The only additional programming necessary for this alternate embodiment would be for the user to program the highest channel number that their system can support so that in the Scan All mode, the remote control transmitter can recognize the upper limit of channels. The Scan All mode would allow a user to scan all channels available from the cable or satellite company.

While a preferred embodiment of the invention has been described using specific terms, such description is for illustrative purposes only, and it is to be understood that changes and variations may be made without departing from the spirit or scope of the following claims.

Claims

What is claimed is:

1. A reconfigurable remote control transmitter for children, said transmitter capable of learning remote control signals from a plurality of existing remote control devices, storing said signals and repeating said signals on demand, so that said remote control transmitter may operate a plurality of components including a television, a VCR and a cable converter box or satellite television converter box, said remote control transmitter comprising:

receiver means for receiving said signals transmitted from an existing remote control transmitter to be emulated during a programming mode;

microprocessor means connected to said receiver means for receiving output of said receiver means;

memory means coupled to said microprocessor means for storing said signals;

transmitter means controlled by said microprocessor means for emulating said signals to control a selected remotely controlled device, said microprocessor means being further programmed to recall from said memory means a desired signal and to cause said transmitter means to transmit said desired signal;

said microprocessor means being further preprogrammed with at least one macro function which causes said remote control transmitter to transmit a plurality of signals to a corresponding number of remotely controlled devices, said signals being

transmitted in a particular sequence and having a timed delay therebetween, so that multiple signals are transmitted in sequence after a user inputs a single command into said remote control transmitter.

2. The reconfigurable remote control transmitter as set forth in claim 1, further including an operating keypad for inputting commands into said remote control transmitter for actuating transmission of said remote control signals.

3. The reconfigurable remote control transmitter as set forth in claim 1, further including a parental keypad for programming said remote control transmitter, wherein said parental keypad is accessible only to an adult user, and which is not accessible to children.

4. The reconfigurable remote control transmitter as set forth in claim 1, wherein said microprocessor means is also capable of learning and storing signals corresponding to a plurality of television channels, one channel of which is designated to be a primary channel, so that said remote control transmitter may be programmed to only access channels that an adult chooses for a child user.

5. The reconfigurable remote control transmitter as set forth in claim 4, wherein said remote control transmitter includes a scan button that actuates said

transmitter to transmit a scan command to scan said programmed television channels.

6. The reconfigurable remote control transmitter as set forth in claim 4, wherein one of said macro functions is programmed to transmit a signal to turn on a television set, then to transmit a second signal causing the television channel to change to said primary channel.

7. The reconfigurable remote control transmitter as set forth in claim 1, wherein one of said macro functions is programmed to transmit a signal to power on a VCR, then to transmit a signal to set a television channel to work in combination with said VCR, and then to transmit a signal to cause said VCR to begin playing a video tape, so that a user may configure said television system to play said video tape by inputting a single command into said remote control transmitter.

8. The reconfigurable remote control transmitter as set forth in claim 1, wherein at least two separate television systems may be operated remotely using said remote control transmitter, so that each television system, which may contain a television, a VCR, and a cable converter box or satellite television converter box, may be operated without a user having to manually switch said remote control transmitter to operate a particular television system.

9. The reconfigurable remote control transmitter as set forth in claim 1, further including a serial communications interface coupled with said microprocessor means for receiving programming data directly from an external data source.

10. The reconfigurable remote control transmitter as set forth in claim 9, wherein said external data source is a computer.

11. The reconfigurable remote control transmitter as set forth in claim 9, wherein said external data source is a separate reconfigurable remote control transmitter.

12. The reconfigurable remote control transmitter as set forth in claim 1, further including a locator means that allows a user to find said remote control transmitter by sounding an audible signal in response to a defined auditory sound.

13. A method of learning, storing and reproducing remote control signals from any of a number of different existing remote controls comprising the steps of:

receiving a transmission from a remote control transmitter;

storing said signals;

assigning each of said signals to correspond with a specific input command;

accessing said signal on command and transmitting said signal to a remotely controlled device; and

providing a preprogrammed macro function so that a plurality of signals may be transmitted in sequence to control a plurality of remotely controlled devices by entering a single input command.

14. The method set forth in claim 13, wherein said step of providing a preprogrammed macro function includes the steps of transmitting said signals to perform the following functions in sequence:

switching on power to a VCR;

setting a television channel to operate in conjunction with said VCR; and

playing a video tape.

15. The method set forth in claim 13, wherein said step of providing a preprogrammed macro function includes the steps of transmitting said signals to perform the following functions in sequence:

switching on power to a television unit;

switching on power to a cable converter box or satellite television converter box;

switching on power to a VCR; and

setting a television channel to a preprogrammed primary channel.

16. The method set forth in claim 13, wherein said step of providing a preprogrammed macro function includes the steps of transmitting said signals to perform the following functions in sequence:

switching on power to a first television unit; and

switching on power to a second television unit.

17. A programming module for a reconfigurable remote control transmitter, said programming module comprising:

a parental programming keypad for entering programming commands;

receiver means for receiving signals transmitted from an existing remote control transmitter;

microprocessing means coupled with said keypad for processing data received from said receiver means and said keypad;

output means for sending processed data to a complemental remote control transmitter.

18. The programming module set forth in claim 17, further including a serial communications interface coupled with said microprocessor means for receiving programming data directly from an external data source.

19. A reconfigurable remote control transmitter capable of learning remote

control signals from a plurality of existing remote control devices, storing said signals and repeating said signals on demand, so that said remote control transmitter may operate a plurality of components including a television, a VCR and a cable converter box or satellite television converter box, said remote control transmitter comprising:

receiver means for receiving said signals transmitted from an existing remote control transmitter to be emulated during a programming mode;

microprocessor means connected to receive output of said receiver means;

memory means coupled to said microprocessor means for storing said signals;

transmitter means controlled by said microprocessor means for emulating said signals to control a selected remotely controlled device, said microprocessor means being further programmed to recall from said memory means a desired signal and to cause said transmitter means to transmit said signal;

an operating keypad having buttons to input commands to be transmitted by said transmitter;

a programming keypad having buttons for inputting programming commands into said remote control transmitter;

said operating keypad including a channel scan button feature capable of switching channels programmed from a favorite channel list in round robin fashion;

said operating keypad also including a toggle switch, allowing a user to

choose between scanning only programmed favorite channels or scanning all available channels.

20. The remote control transmitter set forth in claim 19, wherein said operating keypad also includes a store button feature, which allows a user to program a plurality of additional favorite channels to said favorite channels list.

21. A reconfigurable, remote control transmitter for limited operation of an electrical unit, such as a television set, said transmitter comprising:

an operator keypad; and

a programmer keypad, constructed and arranged to be separate from said operator keypad and generally inaccessible to an intended user of said operator keypad.

22. A reconfigurable, remote control transmitter according to claim 21 in which,

both said operator keypad and said programmer keypad are mounted in a common housing; and

said housing also contains all electronic means required to use said transmitter.

23. A reconfigurable, remote control transmitter according to claim 22 in which,

said programmer keypad and said electronic means have the combined function of programming said transmitter to generate a plurality of signal outputs; and

said operator keypad with said electronic means have the combined function of transmitting certain of said signal outputs to the electrical unit for its limited operation.

24. A reconfigurable, remote control transmitter according to claim 23 in which,

said programmer keypad is useable to reconfigure at least one of said signal outputs;

a specific use of said operator keypad, prior to a reconfiguration, will cause a certain signal output; and

after a reconfiguration by said programmer keypad, the same specific use of said operator keypad will cause a different signal output.

25. A reconfigurable, remote control transmitter according to claim 21 in which, the electrical unit is a televisions set; and

the programmer keypad enables the operator keypad to select a very limited number of viewing channels.

26. A reconfigurable, remote control transmitter according to claim 25 in which,

said operator keypad has a very few channel selection keys, which are distinctive from one another in at least one of shape and color.

27. A reconfigurable, remote control transmitter according to claim 21 in which,

said operator keypad has few selection keys; and

said selection keys are distinctive from each other by at least one of shape and color.

28. A reconfigurable, remote control transmitter according to claim 27 in which,

said selection keys are distinctive by both shape and color.

29. A reconfigurable, remote control transmitter according to claim 21 in which,

said operator keypad includes a power-on control to initiate operation of the electrical unit; and

in the absence of other use of said operator keypad, there is transmitted a default signal which places the electrical unit in a specific operating mode.

30. A reconfigurable, remote control transmitter according to claim 29 in which,

the electrical unit is a television set; and

said default signal selects a favorite channel as said specific operating mode.

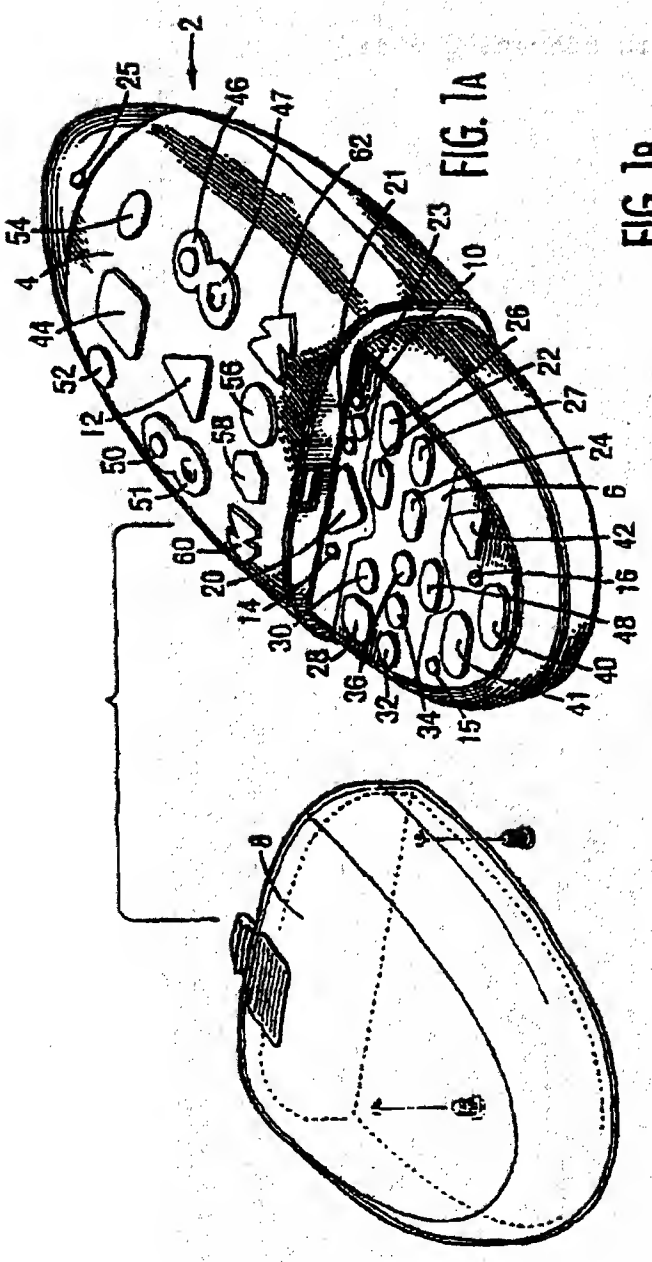

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FIG. 1A

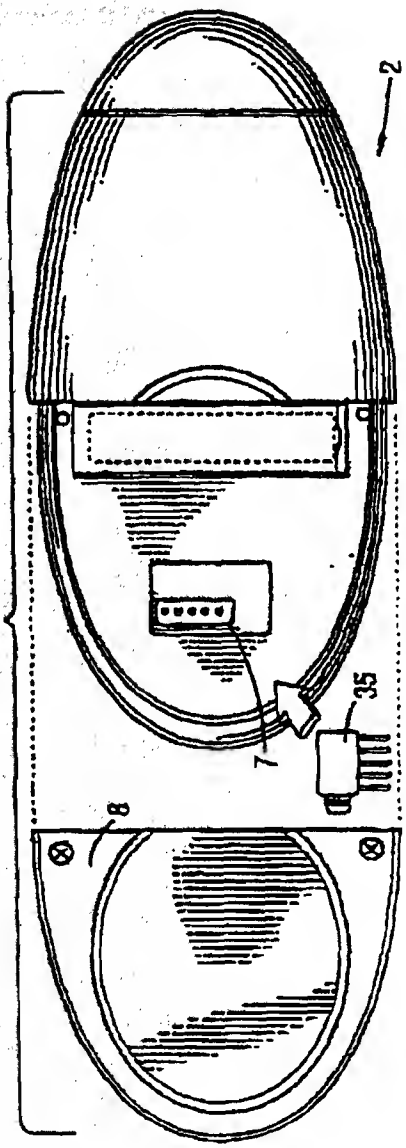
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FIG. 1B

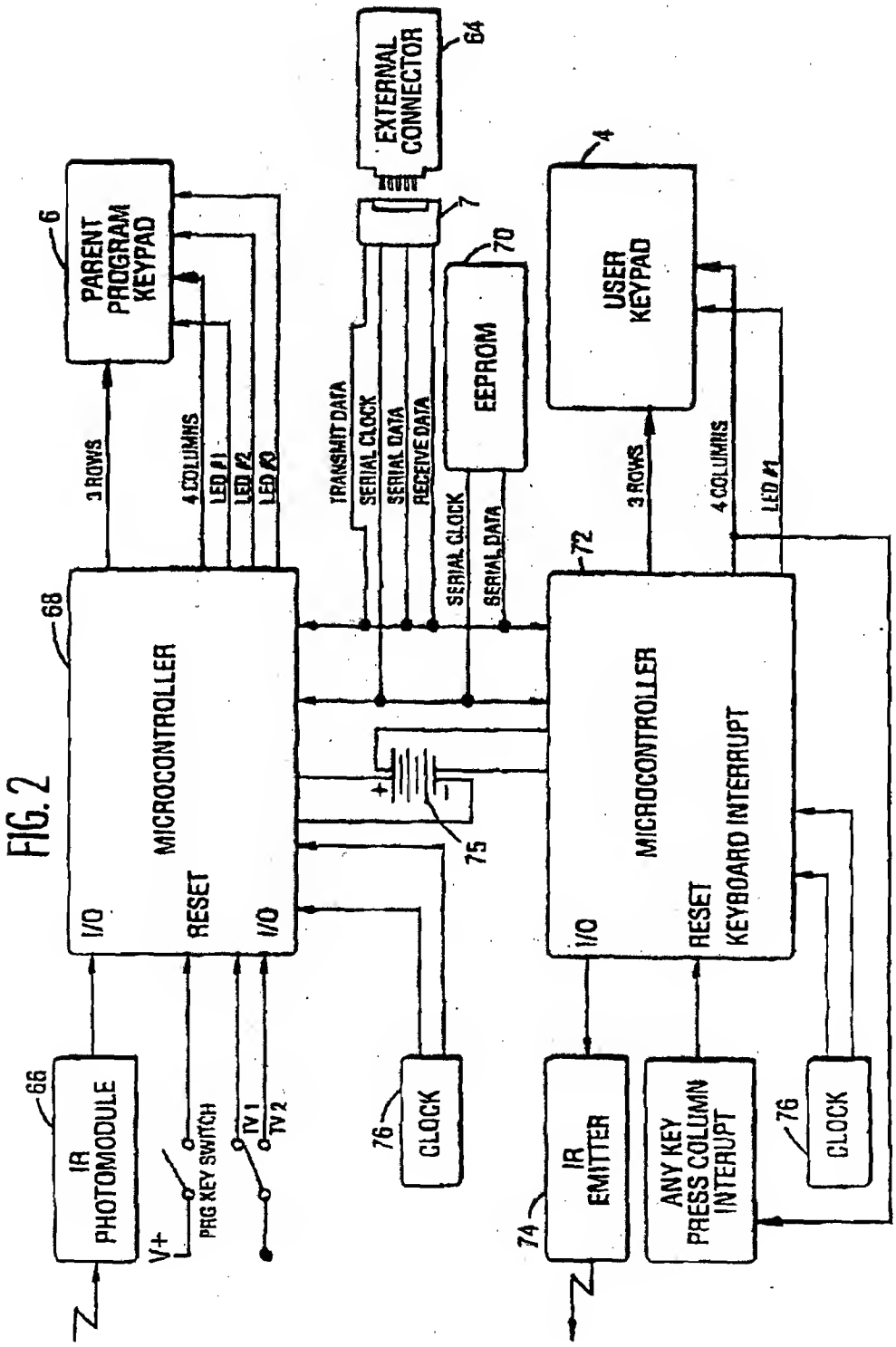

FIG. 2

Gowling Lafleur Henderson LLP

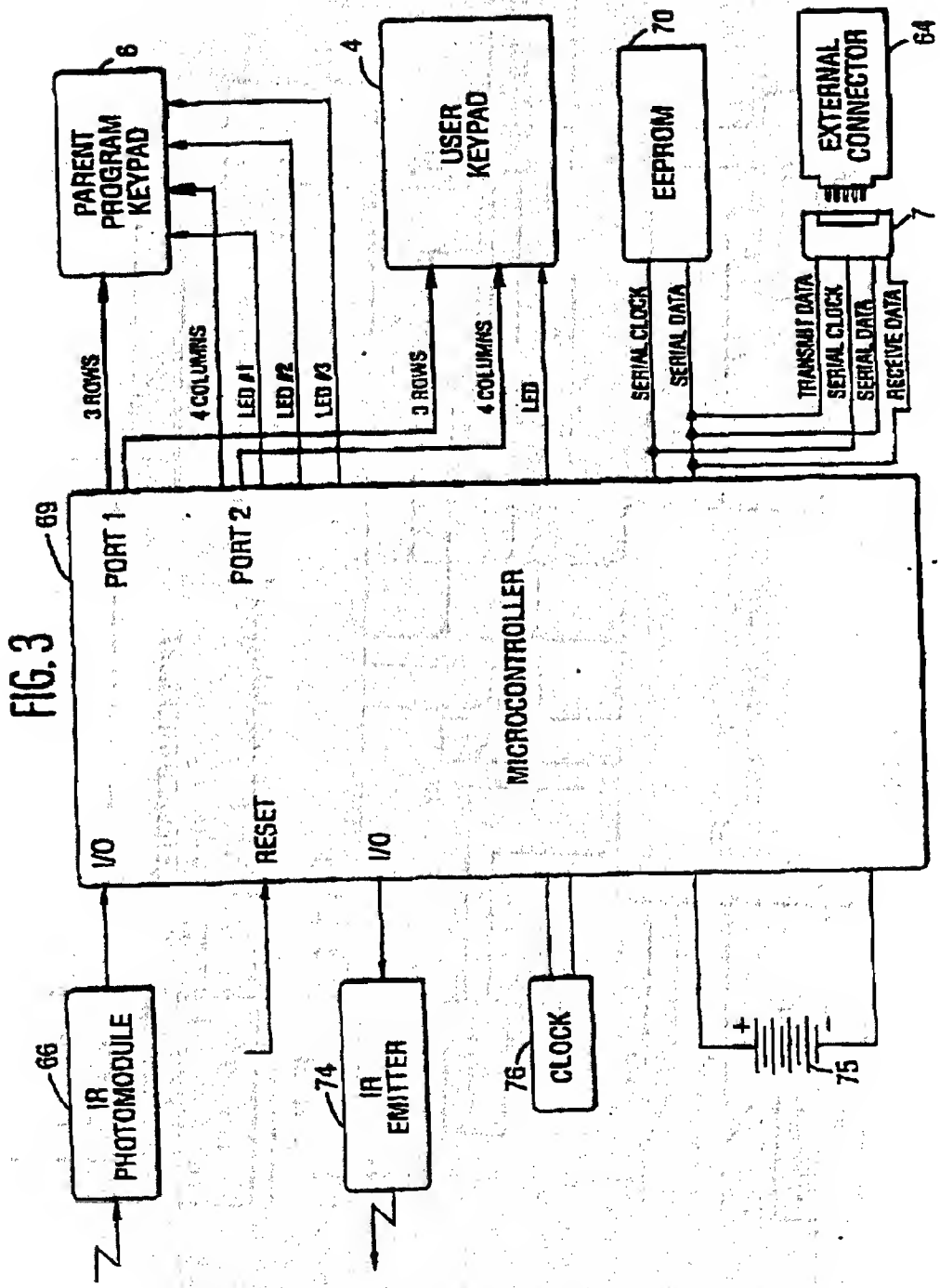

FIG. 3

Gowling Lafleur Henderson LLP

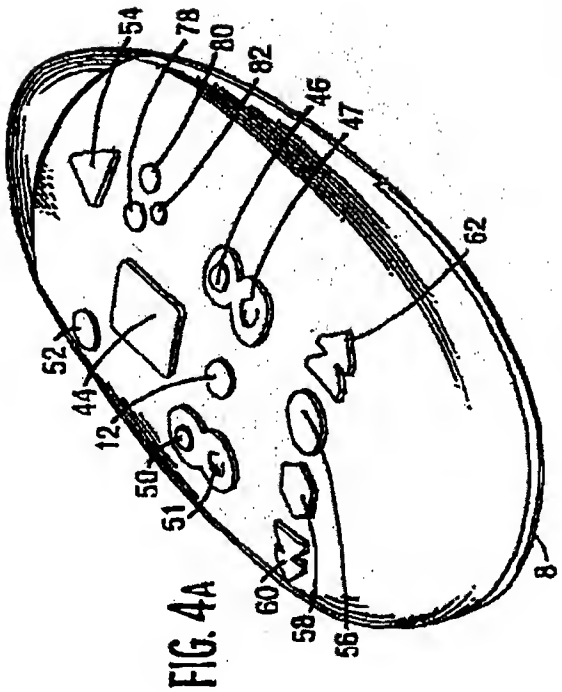

FIG. 4A

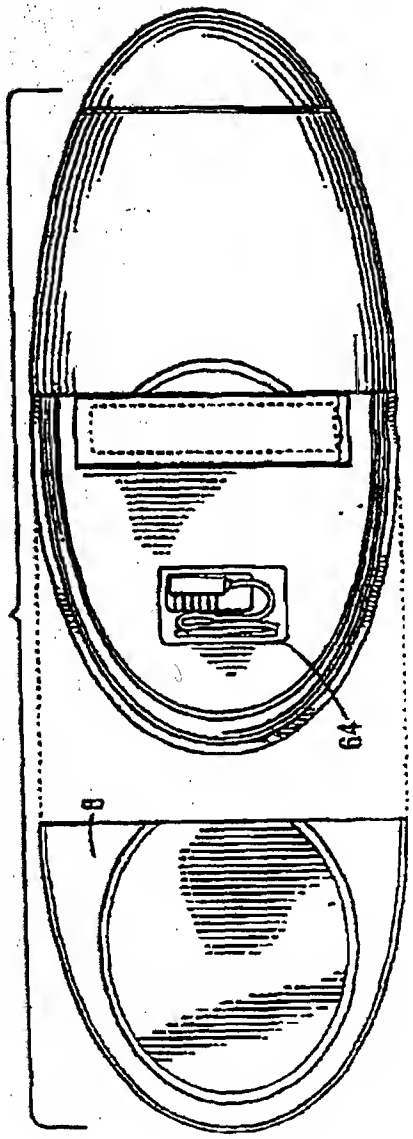

FIG. 4B

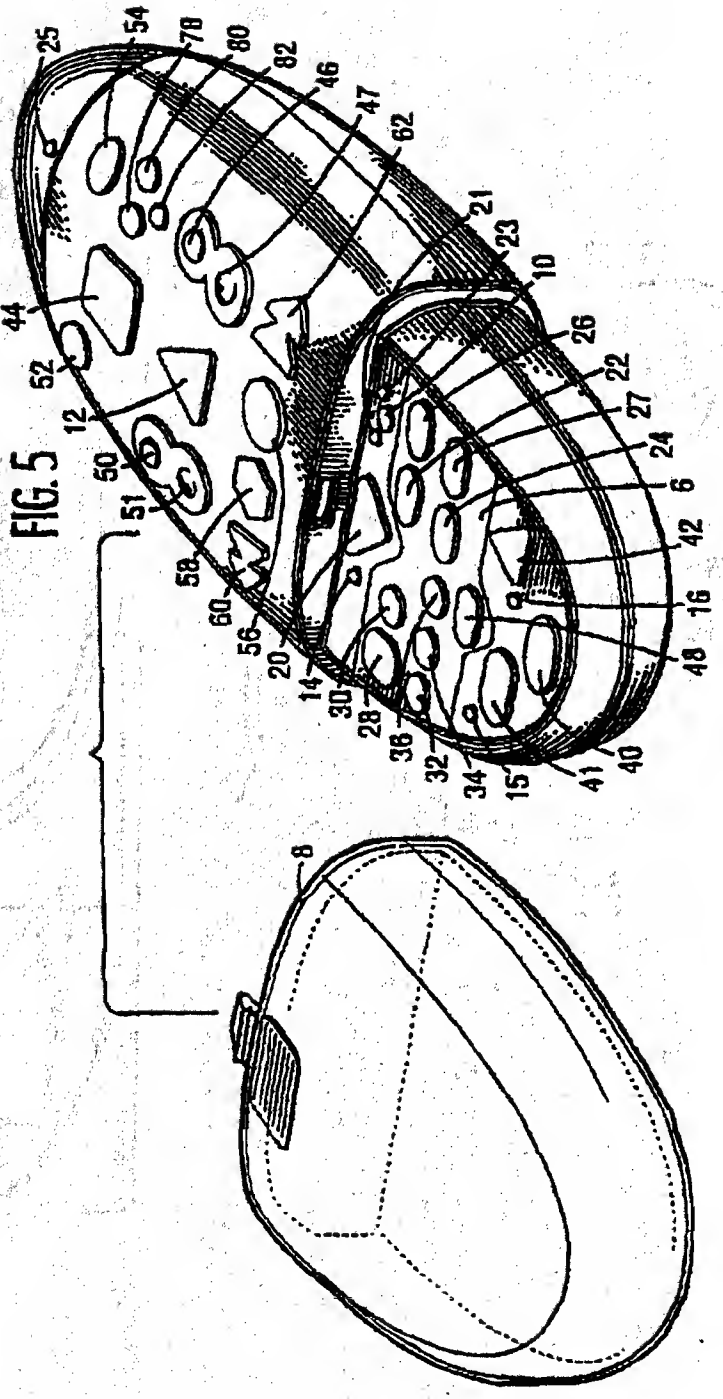
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FIG. 5